



# **CONNECTION ASSESSMENT & APPROVAL PROCESS ASSESSMENT SUMMARY**

**Applicant: Hydro One Networks Inc.**

**Project: Richview TS – Replace 230kV Line  
Disconnect Switch V71R and Breaker  
Disconnect Switch L12L19-12**

**CAA ID: 2002 – EX086**

**Long Term Forecasts & Assessments Department  
Consistent Information Set Department**

**Date: November 15, 2002**

## 1.0 Description of Proposal

Hydro One Networks Inc. is proposing to replace a 230kV line disconnect switch and a 230kV breaker disconnect switch at Richview TS. The proposed work includes the replacement of:

1. The existing 230kV 3,000A line disconnect switch V71R associated with the Richview TS to Claireville TS transmission circuit V71R with a new 230kV 3,000A disconnect switch that is capable of withstanding up to 75kA of short circuit current.
2. The existing 230kV 2,000A breaker disconnect switch L12L19-12 associated with the 230kV 2,000A 69.5kA air blast circuit breaker L12L19 with a new 230kV 2,000A disconnect switch that can withstand up to 63kA of short circuit current.

## 2.0 Assessment

The 230kV Richview TS to Claireville TS transmission circuit V71R is constructed with 1843.2 72/7 and 2332.8 72/19 ACSR conductors. Both conductors have high aluminum to steel ratio and must restrict the high temperature operation to less than 50 hours per year to limit loss of strength due to aluminum annealing.

The maximum continuous operating temperature of the circuit V71R is 93.3°C with a limited time (limited to 50 hours per year) maximum operating temperature of 127°C. The maximum continuous summer and winter thermal ratings of the limiting 1843.2 ACSR section are 1350A and 1940A (Based on 35°C summer and -20°C winter ambient temperatures; 4kM per hour wind with 20° incident angle). A continuous rating of 3,000A for the new line disconnect switch will therefore be adequate.

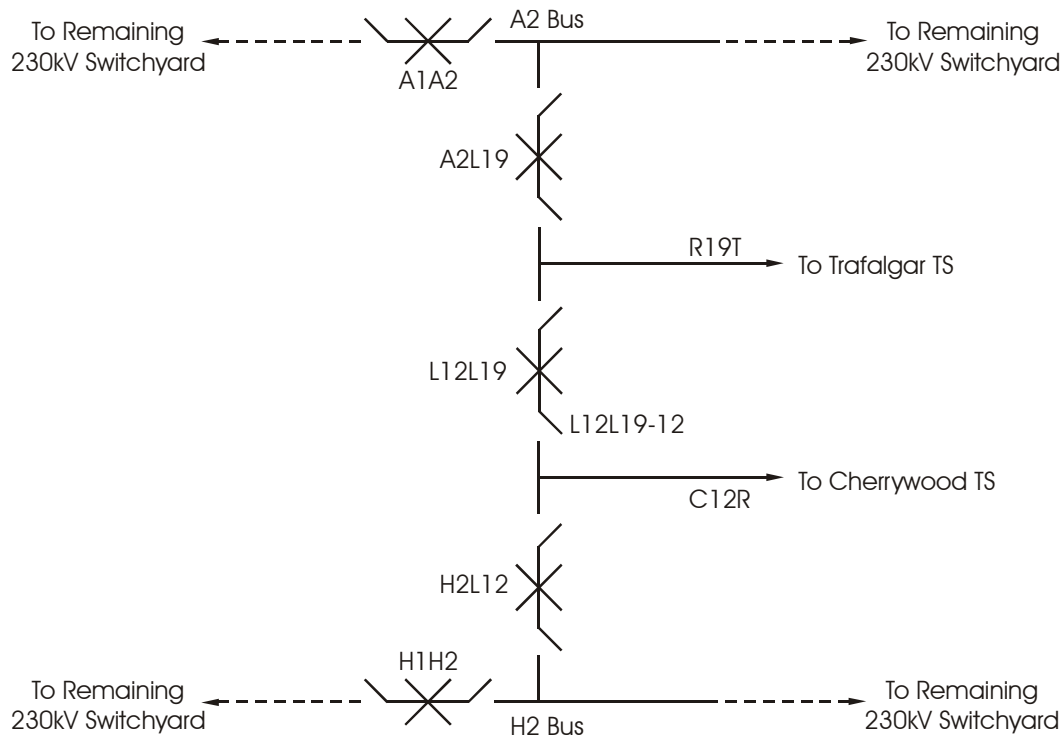
The Richview TS 230kV switchyard has a three-breaker diameter station arrangement (Breaker and half scheme). As shown in Figure 1, 230kV circuit breaker L12L19 together with breakers A2L19 and H2L12 form a diameter that terminates the Richview TS to Trafalgar TS circuit R19T and the Richview TS to Cherrywood TS circuit C12R. With the existing station arrangement, the breaker disconnect switch L12L19-12, when either breaker A2L19 or H2L12 is out of service, will carry the full load of either circuit R19T or circuit C12R. The breaker disconnect switch L12L19-12 must therefore match the ratings of the circuits R19T and C12R.

For both transmission circuits R19T and C12R, the limiting section contains 795 26/7 ACSR with maximum continuous operating temperature of 150°C. The corresponding maximum summer and winter continuous thermal ratings are 1230A and 1460A (Based on 35°C summer and -20°C winter ambient temperatures; 4kM per hour wind with 20° incident angle). A continuous rating of 2,000A for the new breaker disconnect switch will therefore be adequate.

Under certain existing system conditions, the maximum fault level at the Richview TS 230kV busbars could exceed the fault interrupting capability of the 230kV circuit breakers. The 230kV busbars must be ‘split’ by opening bus tie breakers A1A2 and H1H2 to limit the fault level within the breaker interrupting capability. Recent studies for future developments in the area have shown that the fault level at Richview TS could exceed 63kA even with the 230kV busbar operated ‘split’. Since the existing circuit breakers are rated at 69.5kA symmetrical and 84.6kA asymmetrical, it would therefore be prudent to install new disconnect switches that are rated at the same level.

**Richview TS – Replace 230kV Line Disconnect Switch V71R and 230kV Breaker Disconnect Switch L12L19-12**

The proposed new line disconnect switch has a momentary current rating of 120kA and a short duration rating of 75kA, while the proposed new breaker disconnect switch has lower momentary and short duration ratings of 100kA and 63kA. The applicant shall install a new breaker disconnect switch that can withstand up to 70kA symmetrical short circuit current.



**Figure 1: Richview TS – L12L19 Diameter**

### 3.0 Notification of Approval

Based on the above assessment, it is recommended that a Notification of Approval for this proposal be issued to the applicant, subject to meeting the requirement that all the new replacement disconnect switches be capable of withstanding a maximum symmetrical fault level of 70kA.